

# Retrospective Analysis of Geriatric Intoxication Cases

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## Abstract

**Objective:** Physiology changing with age, comorbid diseases in the history of the patient and medication used for this reason cause the emergence of multiple complications in acute poisoning in geriatric age group. Chronic diseases basically present in this population are the most important cause of intentional toxic substance intake.

**Materials and Methods:** In this retrospective study, the data of patients aged 60 and older who referred to the Emergency Medicine Clinic of a tertiary Training and Research Hospital between 2009 and 2019 with a suspicion of intoxication were assessed through hospital information management system.

**Results:** 600 patients referred to emergency service for intoxication within a period of 10 years and 16 (2.66%) of these were in geriatric age group. The patients' age range differed between 60 and 85 years of age. In terms of age distribution, it was found that there were 3 (18.75%) patients aged 80 and older and 2 patients (12.5%) were found to ingest toxic substance intentionally. While male patients who were exposed to toxins unintentionally were higher in number (n=5, 31.5%), the number of patients who were exposed to toxins intentionally were higher among female patients (n=7, 43.75%). While the highest number of unintentional toxic substance exposure occurred with corrosive substance (n=7, 43.75%), the highest number of intentional exposure occurred by taking higher amounts of antipsychotic drugs (n=3, 18.75%) than the therapy dose prescribed for psychiatric diseases. 3 patients who were exposed to toxic substance intentionally were hospitalized and monitored and treated due to the characteristics of the toxic substances they were exposed to and since they had comorbid diseases.

**Conclusion:** Although intentional exposure to toxic substance is the dominant reason for acute intoxication in all age groups, unintentional exposure history is in the foreground in geriatric age groups. However, in 60 years of age and older population, situations which cause limitations in physical movement, depression, social isolation or the presence of diseases which are impossible to treat can cause the emergence of the feeling of self-destruction and result in suicidal attempt.

**Key words:** Geriatric, Intentional, Poisoning, Suicide, Unintentional

## Özet

**Giriş:** Yaşla birlikte değişen fizyoloji, özgeçmişte bulunan komorbid hastalıklar ve bu nedenle kullanılan ilaçlar geriatric yaş grubunda akut zehirlenmeler de çoklu komplikasyonların ortaya çıkmasına neden olur. Bu nüfusta temelde mevcut olan kronik hastalıklar istemli toksik madde alımlarının en sık nedenidir.

**Materyal-Metod:** Bu retrospektif çalışma, üçüncü basamak Eğitim ve Araştırma Hastanesinin Acil Tıp Kliniğine 2009 ve 2019 yılları arasında zehirlenme şüphesi nedeniyle başvuran 60 yaş ve üzeri geriatric hastaların verileri, hastane bilgi yönetim sistemi üzerinden değerlendirildi.

**Bulgular:** 10 yıllık süre içerisinde zehirlenme nedeniyle acil servise 600 hasta başvurmuş, bunlardan 16'sı (%2.66) geriatric yaş grubuna aitti. Hastaların yaş aralığı 60 ve 85 yaş arasında değişmekteydi. Yaşa göre dağılıma bakıldığında 80 yaş ve üzerinde 3 hastanın (%18.75) olduğu ve 2 hastanın (%12.5) istemli olarak toksik madde alımı olduğu tespit edildi. İstemeden toksine maruz kalan hastalarda erkek cinsiyet (n=5, %31.5) daha fazlayken isteyerek kasıtlı olarak maruz kalan hastalarda kadın cinsiyet (n=7, %43.75) sayıca fazlaydı. İstemeden toksine maruz kalan hastalarda en fazla koroziv maddeye (n=7, %43.75) maruziyet varken isteyerek kasıtlı olarak maruziyette ise hastaların psikiyatrik hastalıkları nedeniyle aldıkları antipsikotik ilaçların (n=3, %18.75) tedavi dozundan daha yüksek miktarlarda alımı vardı. İsteyerek kasıtlı olarak toksik maddeye maruz kalan 3 hasta, aldıkları toksik maddelerin özellikleri ve ek komorbid hastalıkları olması nedeniyle yatırılarak takip ve tedavileri yapılmış.

**Tartışma:** İstemli olarak toksik maddeye maruziyet tüm yaş gruplarında akut zehirlenmenin baskın nedeniyken geriatric yaş gruplarında istemsiz maruziyet öyküsü ön plandadır. Ancak 60 yaş ve üzeri nüfusta fiziksel hareket kısıtlılığına neden olan durumlar, depresyon, sosyal izolasyon ya da tedavisi mümkün olmayan hastalıkların varlığı kendi kendine zarar verme duygusunu ortaya çıkartarak intihar girişimine neden olabilmektedir.

**Anahtar Sözcükler:** Geriatric, İstemli, İstemsiz, Öz kıyım, Zehirlenme

## Introduction

In addition to being an important health problem in all societies, poisoning is also a sociocultural and economic burden<sup>1, 2</sup>. Both intentional and unintentional toxic substance

exposure is the reason for acute poisoning in geriatric age groups of 60 years and older. Geriatric group constitutes about 2,3% and 5,3% of all the patients who refer with acute intoxication<sup>3</sup>. In addition, comorbid diseases in the history of this age group, the medication used for this reason and

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the physiological structure that changes with age prepare a basis for the emergence of multiple complications caused by toxicity<sup>4</sup>.

Chronic illnesses, psychiatric background and/or diseases are seen as the most important reason for toxic substance exposure in old patients. Studies conducted have reported that old age is a reason for suicide in many parts of the world and that this risk is higher in individuals aged 65 and older when compared with the young population<sup>5,6</sup>.

The aim of this study is prospective assessment of 60 years of age and older patient group who referred to a tertiary healthcare hospital for acute poisoning.

## Materials and Methods

This retrospective study was conducted in the Emergency Medicine Clinic of a tertiary Training and Research Hospital between 2009 and 2019. The data of 60 years of age and older patients who referred with a suspicion of poisoning were collected through hospital information management system. The patients were grouped in two categories as unintentional and intentional toxin exposure according to ICD 10 codes. The two groups were compared in terms of demographic parameters, clinical findings, symptoms, complications and mortality/morbidity.

The toxin was determined through files according to anamnesis taken from the patient, family or relatives. The detailed history of the underlying comorbidity, predisposition of the psychiatric conditions which triggered the suicide attempts and the underlying situations were assessed in all patients.

The toxic agents taken were classified as corrosive substance, selective serotonin reuptake inhibitors (SSRI), organophosphate, antipsychotic, nonsteroid anti-inflammatory drug, antiepileptic, rat poison, and toxic alcohol intoxication.

The data were assessed by using SPSS for Windows version 17 (SPSS, Chicago, IL, United States). Descriptive statistics were given as average  $\pm$  standard deviation for metrical discrete variables and as case and percentage number for categorical variables.

## Results

It was found that 600 patients referred for intoxication within a period of 10 years and 16 (2.66%) of these were in geriatric age group. In terms of age distribution, it was found that there were 3 (18.75%) patients aged 80 and older and of these three patients, one patient (6.25%) was found to have involuntary exposure, while 2 (12.5%) were found to

be exposed to toxic substance intentionally. Demographic characteristics of the patients are summarized in Table 1.

**Table 1.** Demographic characteristics of geriatric patients who referred for poisoning (n=16).

Female	10 (62.5%)	
Male	6 (37.5%)	
Age	67.25 $\pm$ 8.5 (min.:60, max.:85)	
Unintentional exposure	8 (50%)	
Intentional exposure	8 (50%)	
Psychiatric disease history	Unintentional exposure	1 (6.25%)
	Intentional exposure	3 (18.75%)

While male patients who were exposed to toxins unintentionally were higher in number (n=5, 31.5%), the number of patients who were exposed to toxins intentionally were higher among female patients (n=7, 43.75%). Psychiatric disease history was in the forefront in female patients n=4, 25%)

While the highest number of unintentional toxic substance exposure occurred with corrosive substance (n=7, 43.75%), the highest number of intentional exposure occurred by taking higher amounts of antipsychotic drugs (n=3, 18.75%) than the therapy dose prescribed for psychiatric diseases. Frequency of toxic substance is shown in Table 2.

The most frequent reason for referral following corrosive substance intake was burning sensation in the throat (n=7, 43.75%). In the physical examination following referral, hyperemia was seen in pharynx region in 4 patients (25%) and in the emergency endoscopic assessment, while esophagitis due to corrosive substance was found in 3 patients (18.75%), hemorrhage and ulceration findings due to transmural involvement were found in one patient (6.25%). Since no pathologies were found in the symptoms and phys-

**Table 2.** Toxic substances patients were exposed to

Unintentional exposure	Corrosive substance	7 (43.75%)
	Toxic alcohol	1 (6.25%)
Intentional exposure	Antipsychotic	3 (18.75%)
	NSEID	2 (12.5%)
	Antiepileptic	1 (6.25%)
	Anxiolytic	1 (6.25%)
	Rat poison	1 (6.25%)

ical examinations of 3 patients who referred following corrosive substance ingestion, they were discharged following 4-hour-long emergency service follow-up as a result of not developing intolerance to solid and liquid food. However, 3 (18.75%) of the patients who were found to have symptoms and pathological findings in physical and endoscopic examination were followed for 24 hours in clinic and discharged with the recommendation of control. The patient who was found to have transmural hemorrhage and ulceration in endoscopic assessment was followed-up in the intensive care unit and became exitus on the third day of follow-up after developing mediastinitis.

The patient who was exposed to toxic alcohol unintentionally was brought to emergency service by his relatives for blindness and sleeping state. He was hospitalized and treated in the intensive care unit after increased anion-sparing metabolic acidosis and renal failure was found in his assessment. Three patients who were exposed to toxic substance intentionally were hospitalized and treated because of the characteristics of the toxic substances they ingested and since they had comorbid diseases. Among this patient group, the patient who had a history of schizophrenia diagnosis and who was poisoned due to toxic dose intake of the drug called Lityum that he was using was followed in the intensive care unit. When the intentional toxic substance intake group was examined generally, it was found that 8 (50%) patients had a chronic disease that could cause comorbidity and they took these substances to get rid of the chronic picture caused by these diseases

## Discussion

With the decrease in fertility and deaths, an increase in old population has occurred. This increase has also caused an increase in the incidence of chronic diseases, disabling diseases and diseases causing stress. Thus, both intentional and unintentional toxic substance exposures that we see in young population also began to be seen in old population<sup>7</sup>. In this study, when age distribution was reviewed, it was found that 18.75% of the patients were 80 years old and older. When the characteristics of this patient group were examined, it was found that 12.5% were exposed to toxic substance intentionally due to their chronic diseases affecting quality of life. The results of studies conducted are in parallel with our results in this aspect<sup>8</sup>.

There are not many studies about the clinical features of acute poisoning in geriatric age group. While it was found in previous acute poisoning cases that male gender was on the forefront<sup>3</sup>, females were on the forefront in the present

study. It is thought to result from the differences of fighting social differences and the pressures on the female gender in our region. However, while there were more males involved in unintentional exposures, there were more females involved in intentional toxic substance exposure.

While intentional toxic substance exposure is the dominant reason of acute poisoning in all age groups, geriatric age group has unintentional exposure history<sup>9</sup>. In our study, the rates of intentional and unintentional exposure to toxic substance were found to be equal. The characteristics of the toxic substance patients were exposed to show social and even regional differences. For example, irrespective of general age and gender, the toxic substance most exposed to in society is drugs with a rate of 56% in Iran, while its is corrosive substances used at home in India with 44%<sup>10, 11</sup>.

Chemical substances used at home are sources of intentional or unintentional exposure in different age groups<sup>12</sup>. The rate of mortality is higher especially in exposures of individuals aged 60 and older when compared with other age groups. While complications of the respiratory system are seen as the reason for increased mortality, no association was found between gastrointestinal system complications and mortality<sup>13</sup>. Mediastinitis developed in one patient and resulted in death in the present study. Lesions were found in 18.75% of the patients in endoscopic assessments of the gastrointestinal system; however, the patients were discharged from the emergency service without developing any complications as a result of follow-ups. This result is also in parallel with the literature.

As in young population, 60 years and older age group also consume alcohol<sup>14</sup>. Old individuals may consume it as a response to severe life conditions. Studies conducted have not found differences in terms of both complications and intensive care follow-up durations of this patient group following toxic alcohol intake<sup>9</sup>. In the present study, toxic alcohol intake was found in one patient and the patient was not found to differ with the group younger than 60 years of age in terms of the clinical picture that emerged in the follow-ups.

For geriatric population, the toxic substance most exposed to was found to be drugs<sup>14</sup>. In our study, it was found that the substances taken intentionally for self-harm were drugs the patients were using for their existing psychiatric diseases or chronic diseases. In the population aged 60 and older, situations which cause limitations in physical movement, depression, social isolation or the presence of diseases which are impossible to treat can cause the emergence of the feeling of self-destruction and result in suicidal attempts<sup>15</sup>. In the present study, of the patients who were exposed to toxic substance intentionally, 18.75% had a psychiatric dis-

ease, 18.25% had diseases such as cancer and chronic cardiac failure that they thought could not be treated and 6.25% had a condition that caused limitation of motion. These results, especially the positive association between underlying diseases and the structural, physiological and psychogenic changes caused by these diseases were in parallel with other results conducted<sup>14,15</sup>.

Globally, pesticides are considered to be responsible for 30% of intentional toxic substance exposures. In our country, as in countries such as China, Africa and India, pesticides are the most ingested toxic substances for suicidal purposes between 16 and 60 years of age and rodenticides are the second most ingested substances according to the data of National Poison Information Centre<sup>16</sup>. One of the patients in this study was older than 80 years of age and she stated that she ingested rat poison to get rid of the situation she was in due to ovarian cancer. This situation is a result of desperation in geriatric population and it occurs as an indicator of the wish of individuals to end their lives.

Mortality rates which occur as a result of toxic substance exposure are determined by the toxic substance exposed to, age and comorbid diseases. In patients aged 60 and older, the rates differ based on country and region<sup>17,18</sup>. However, the important point here is being aware of the fact that a population with a high risk is in question rather than mortality rates and more care should be taken in emergency service management of the patients.

Not many studies were found in literature about the exposure of 60 years of age and older population with intentional and unintentional toxic substance. Although 10-year-long patient data were assessed in the present study, the most important reasons for limitation are the fact that the study had a single centre and the number of cases was low. However, the reasons for the low number of cases in the study are thought to be the fact that intentional self-harm is not considered as a suitable behaviour in terms of religion and morality in the society the study was conducted in and that the age group was 60 years of age and older.

As a conclusion, geriatric patient group show a higher tendency to undesired drug reactions or unintentional poisoning as a result of multiple drug use and getting unprescribed drugs. Together with natural physiological changes associated with aging, altered pharmacological and pharmacokinetic characteristics create a tendency for this situation. This is the reason why there are more complications when compared with young patient population. Starting the treatment to detect toxic exposure on time and to prevent the development of multiple complications and treatment management should be the job of emergency physician. Necessary social support programs should be supported by knowing that

there is a high toxic substance exposure risk especially in geriatric population. In case of determination of destructive reasons such as psychiatric, chronic and sociodemographic diseases, treatment can be possible only through assessment of many disciplines such as emergency medicine, psychiatry and family practice within an integrated approach.

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